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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

CANTELMO, GREGG

ART UNIT

PAPER NUMBER

1745

18

DATE MAILED: 08/21/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/236,113

Applicant(s)

SHI ET AL.

Examiner

Gregg Cantelmo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 May 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the amendment received May 31, 2002:
 - a. The issues regarding priority have been withdrawn in light of Applicant's response;
 - b. The drawing objection has been withdrawn in light of Applicant's amendment;
 - c. The specification objections have been withdrawn in light of Applicant's amendment;
 - d. The claim objections have been withdrawn in light of Applicant's amendment;
 - e. The 112 first paragraph and second paragraph rejections have been withdrawn in light of Applicant's amendment;
 - f. The prior art rejections to Khominich have been withdrawn since Applicant has perfected priority before the filing date of this reference;
 - g. The 102 rejection to EP '447 is withdrawn;
 - h. The 102 and 103 rejections drawn to Semenyuk stand.

Election/Restrictions

2. This application contains claims 17-25 drawn to an invention nonelected without traverse in Paper No.15. A complete reply to the final rejection must include

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cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims are rejected under 35 U.S.C. 102(b) as being anticipated by Semenyuk, of record and for the reasons of record.

Semenyuk discloses a cathodic arc source comprising: cathode , anode/ process chamber 2, means 5 for generating a magnetic field within chamber 2, cathode station for location of a target 1 in electrical contact with cathode, the target having front and rear surfaces, the magnetic field generating means 5 generates a magnetic field at the front surface of the target having a lateral field component effective to maintain the arc on the front surface of the target during operation (see Fig. 1 as applied to claim 10).

While intended use recitations and other types of functional language cannot be entirely disregarded. However, in apparatus, article, and composition claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference

as compared to the prior art. In re Casey, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); In re Otto, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963).

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). See also MPEP § 2114.

The manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

It is held that the magnetic field arrangement of Semenyuk, which provides an electromagnet 4 below the cathode emitting surface and an electromagnet 5 above the cathode emitting surface are positioned such that they are capable of generating the claimed magnetic field arrangement of claim 10.

Response to Arguments

5. Applicant's arguments filed May 31, 2002 have been fully considered but they are not persuasive.

Applicant argues that the prior art teachings of Semenyuk does not disclose the particular magnetic field arrangement. The examiner disagrees with Applicant's position since they appear to argue an intended use of the electromagnets to provide for a particular magnetic field configuration. Semenyuk's electromagnets are positioned in a

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manner identical to that of the instant invention with one electromagnet being positioned above the cathode emitting surface and the other electromagnet being positioned below the cathode emitting surface (Fig. 1).

While intended use recitations and other types of functional language cannot be entirely disregarded. However, in apparatus, article, and composition claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. In re Casey, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); In re Otto, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963).

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). See also MPEP § 2114.

The manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

It is held that the magnetic field arrangement of Semenyuk, which provides an electromagnet 4 below the cathode emitting surface and an electromagnet 5 above the

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cathode emitting surface are positioned such that they are capable of generating the claimed magnetic field arrangement of claim 10.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-9 and 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Semenyuk in view of Falabella '363, all of record and for the reasons of record.

With respect to claim 1 Semenyuk discloses a cathode arc source comprising: cathode, anode/vacuum chamber 2, means for generating a magnetic field in the chamber having a direction normal to the front surface of the target and zero field strength positioned above the target within the chamber. The magnetic field is generated by a first field generating means 5 located above the target and second field generating means 4 located below the target (see Fig. 2b as applied to claim 1). The chamber is the anode (page 872, column 1, as applied to claim 2). The magnetic and electric fields within the system of Fig. 1 serve to confine the positive ions in a beam towards the substrate (as applied to claim 9).

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The difference between the instant claims and Semenyuk is that Semenyuk does not disclose using a graphite cathode source (claim 1):

With respect to claims 3-8:

With respect to the particular field strengths of claims 3-8, such conditions are not held to be structural differences between the instant claimed apparatus and prior art apparatus. Note that Khominich uses adjustable power supplies to each coil. This teaches of a cathode arc source wherein any desired field strengths can be selected to create a desired field pattern. Thus the null or zero field point can be adjusted in any number of ways, readily apparent to one of ordinary skill in the art. Since claims 3-8 do not structurally differentiate the instant apparatus and that of the prior art here, no patentable weight is accorded the desired fields strengths.

While intended use recitations and other types of functional language cannot be entirely disregarded. However, in apparatus, article, and composition claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. In re Casey, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); In re Otto, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963).

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). See also MPEP § 2114.

The manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

The arc system is used for various materials (page 872, column 1, ll. 1-10). Selection of the particular cathode material is dependent upon the desired film to be coated onto a substrate.

Use of graphite cathode sources in cathode arc deposition is well known in the art as taught by Falebella '363 (col. 3. ll. 55-60) or the admitted prior art relied upon in the instant application (page 2, ll. 7-15).

The motivation for selection of graphite as the cathode source is to deposit carbon films onto the substrate.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Semenyuk by selecting the cathode to be a particular material, in the case of the instant claims, of graphite, since selection of a preferred material would have been an obvious design choice dependent upon the requisite coating to be applied to the substrate, graphite being a known source

used as a cathode in cathodic arc sources. Selection of a known material on the basis of its suitability for the intended use has been held to be a matter of design choice. *In re Leshin* 125 USPQ 416.

With respect to claims 11-16:

Semenyuk discloses a method of striking an arc at a cathode target in a vacuum chamber comprising: generating a first magnetic field below the target 1 from magnetic means 4 and a second magnetic mean 5 having a second direction opposite to that of the first means 4 located above the target 1 (See Fig. 1) to generate a magnetic field that is resultant from the two fields where the arc is struck within the field (see Fig 2b and page 872, column 1, lines 1-3 as applied to claim 11). The arc is struck between the cathode and chamber wall anode 2 (Fig. 1 as applied to claim 12). Figs. 2 a and b show the magnetic field structure when only one coil is energized and when both coils are energized. This teaches of varying the resultant field by energizing both coils to optimize arc striking near the operating end of the cathode surface (as applied to claim 13). The fields are coaxial with the plasma emitted when the coils are energized as shown in Fig. 2b (as applied to claims 15 and 16). Semenyuk uses the upper magnetic field means to steer the plasma towards the substrate 31 (Fig. 8 as applied to claim 14) but is silent as to using a macroparticle filter.

The differences between the instant claims and Semenyuk are that Semenyuk does not disclose using a graphite source (claim 11) or using a macroparticle filter (claim 14).

With respect to claim 11:

The arc system is used for various materials (page 872, column 1, ll. 1-10). Selection of the particular cathode material is dependent upon the desired film to be coated onto a substrate.

Use of graphite cathode sources in cathode arc deposition is well known in the art as taught by Falebella '363 (col. 3, ll. 55-60) or the admitted prior art relied upon in the instant application (page 2, ll. 7-15).

The motivation for selection of graphite as the cathode source is to deposit carbon films onto the substrate.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Semenyuk by selecting the cathode to be a particular material, in the case of the instant claims, of graphite, since selection of a preferred material would have been an obvious design choice dependent upon the requisite coating to be applied to the substrate, graphite being a known source used as a cathode in cathodic arc sources. Selection of a known material on the basis of its suitability for the intended use has been held to be a matter of design choice. *In re Leshin* 125 USPQ 416.

With respect to using a macroparticle filter (claim 14):

Falabella '363 uses a macroparticle filter 11 prevents macroparticles from bouncing off the walls of the chamber and thus reaching the part to be coated.

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The motivation for using a macroparticle filter is to filter the macroparticles out of the plasma thereby preventing macroparticle deposition onto the part to be coated.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Semenyuk by using a macroparticle filter as taught by Falabella '363 since it would have prevented macroparticle deposition onto the part to be coated.

Response to Arguments

8. Applicant's arguments filed May 31, 2002 have been fully considered but they are not persuasive.

Applicant argues that replacing the metal target with a graphite target would result in an inoperative device. Applicant's position is not persuasive. First there is no clear evidence as to the inoperative nature of such a replacement of the cathode material. Second the placement of the electromagnets of Semenyuk are identical to that of the instant invention, in that there is one electromagnet positioned above the cathode emitting surface and one electromagnet positioned below the cathode emitting surface (Fig. 1 of Semenyuk compared to Fig. 1 of the instant application). Thus upon replacing the cathode material of Semenyuk to be graphite, the electromagnetic configurations of the prior art and instant invention being identical, would appear to be capable of providing the same magnetic field configurations.

Applicant further argues that Semenyuk's source must work without a filter to have the claimed advantages of high ion current, high intrinsic energy, high coating rate,

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etc. Yet at no point does the prior art reference clearly state that the system "must" work without a filter.

In addition, the use of a filter would have improved macroparticle filtration. Thus one of ordinary skill in the art would have found it obvious to further use a filter, even though it may decrease ion current, for the benefit of increasing the removal of macroparticles from the plasma.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPAT 6,026,763 is cited of interest but does not overcome the priority date of the instant application.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (703) 305-0635. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (703) 308-2383. FAX communications should be sent to the appropriate FAX number: (703) 872-9311 for After Final Responses only; (703) 872-9310 for all other responses. FAXES received after 4 p.m. will not be processed until the following business day. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

gc


Patrick Ryan
Supervisory Patent Examiner
Technology Center 1700

August 15, 2002